Norfolk County Council

GREAT YARMOUTH THIRD RIVER CROSSING

Non-Technical note on traffic modelling

70041951
JUNE 2018

PUBLIC

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DOCUMENT PUBLIC

PROJECT NO. 70041951
OUR REF. NO. 70041951

DATE: JUNE 2018

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft	Rev e	Table text	Table text
Date	June 2018	12 July 2018	Table text	
Prepared by	Iñaki Gaspar	Amanda Fogg	Table text	
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Checked by	Colin Wright	Amanda Fogg	Table text	Table text
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Authorised by	Amanda Fogg	Amanda Fogg	Table text	Table text
Signature				
Project number	70041951	70041951	Table text	Table text
Report number	1	1		
File reference	Table text	Table text	Table text	Table text

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APPENDICES

1 SCOPE OF THIS NON-TECHNICAL SUMMARY

1.1.1. The purpose of this note is to briefly describe the processes that have been undertaken to produce the data that is presented as part of the pre-application consultation associated with proposals for the Great Yarmouth Third River Crossing (GYTRC) Scheme. This includes describing the transport models that have been developed and the data that they rely upon, how these have been used in forecasting future travel demand and how the forecasting work has been used to produce estimates of future traffic levels with and without the proposed Scheme. This is a non-technical summary which will be expanded upon, by detailed reports and technical work, during the continuing development of the scheme and the Development Consent Order application process.

2 OVERVIEW OF THE TRANSPORT MODELS

2.1 THE GREAT YARMOUTH STRATEGIC TRAFFIC MODEL

2.1.1. The Great Yarmouth Strategic Traffic Model (GYSTM) was originally developed in 2002 by Norfolk County Council (NCC) and has been updated a number of times since then, including in 2003 by Mott MacDonald (MM) to represent the traffic conditions of Great Yarmouth in detail. The 2003 Great Yarmouth model was subsequently revalidated to 2008 traffic levels by MM.

2.1.2. The model was rebased to 2016 using new traffic data collected for the purpose of providing evidence for the GYTRC Outline Business Case (OBC) submission. Forecasts of traffic relating to the Proposed Scheme for the future years of 2023, 2038 and 2051 were created.

2.1.3. The model was recently updated to produce a 2018 base with reference to additional data collection and the inclusion of recently completed local highway schemes. The future year forecasts were also updated to represent changes in the Proposed Scheme design, committed infrastructure on both the Strategic Road Network (SRN) and local network, and committed land use developments.

GENERAL FORM OF THE MODELS

2.1.4. The GYSTM model framework consists of two main elements.

2.1.5. **Highway Traffic Model** - The highway traffic model is a traffic assignment model that predicts the travel routes and costs for vehicles travelling through the network. The model comprises a representation of the highway network which is modelled in detail in Great Yarmouth and the immediate urban areas, but with a coarser network resolution in surrounding areas to represent routes approaching Great Yarmouth. Across the town queues and delays at junctions are simulated in the model, and these are taken into account in the predictions of travel routes. Traffic demand is loaded onto the network from zones which represent areas of trip generation across Great Britain, with relatively small zone areas in Great Yarmouth and progressively larger zones further away from the town.

2.1.6. **Demand Model** - This is a variable demand model which varies the traffic demand in the highway traffic model. The demand model is used to represent behavioural responses to changes in travel costs such as changes in the location of trip ends, changes in mode, or changes in the timing of travel, for example from peak to off peak.

2.1.7. The overall modelling framework has been developed to be consistent with the guidance set out by the Department for Transport in their Web-based Transport Appraisal Guidance, WebTAG.

TIME PERIODS

2.1.8. The highway assignment model has been developed for three time periods:

- AM Peak Hour (08:00-09:00hrs)
- Average Inter-Peak Hour (10:00-15:30hrs)
- PM Peak Hour (16:30-17:30hrs)

DATA USED IN BUILDING THE BASE MODEL

Overview

2.1.9. To develop a transport model requires information on travel patterns i.e. where people are travelling from and to and the volumes of traffic making these journeys. The network performance also needs to be represented so that travel times and junction delays are reproduced in the model.

2.1.10. Information required to develop the model is acquired through a number of survey methods to collect information on travel patterns and volumes and on the network performance. A summary of the key data used to develop the models is outlined in the following sections.

Road Side Interview Surveys

2.1.11. The highway traffic model makes use of new roadside interview (RSI) data collected in 2016. These surveys capture a sample of drivers at interview locations to ascertain for each journey the start and end of their trip and the purpose of the journey, amongst other data collected. Surveys were carried out over 12 hour periods at key locations to capture the major traffic movements in the Great Yarmouth area.

Traffic count data

2.1.12. In 2016, a traffic data collection exercise was carried out across Great Yarmouth. Data collected included links counts and junction turning counts. Some counts were used in model development and others to adjust and check that the highway model accurately represents the existing situation.

Journey time data

2.1.13. The highway model makes use of 2016 journey time information (ie time taken to traverse the highway network from a point A to a point B) which was collated for a selection of routes running in or around Great Yarmouth. The purpose of this exercise is to provide data that allows the model to be adjusted and checked against observed conditions.

MODEL NETWORK

Geographical extent of model and network hierarchy

2.1.14. The geographical extent of the highway model has been designed so that it is suitable for assessing the impact of the Third River Crossing and other schemes that are currently being implemented or developed for implementation. This means the model can reflect traffic routing in and around the Great Yarmouth urban area and strategic traffic travelling from the surrounding areas to the town and around it.

Zoning

2.1.15. The zoning system consists of 240 zones in total covering the whole of Great Britain, with smaller zones in the study area in Great Yarmouth and progressively larger zones further away from Great Yarmouth.

TRAVEL DEMAND

2.1.16. The travel demand has been produced by merging observed travel data with estimates made from a travel estimation model. The observed data from the RSIs and traffic counts are used to build tables of observed travel demand between the zones in the model, whilst the travel estimation model predicts the travel between zones based on the households and employment in each zone and the distance between the zones. The observed data can only capture travel that has been observed where the RSI surveys took place, so merging this data with the estimated demand means that movements can be included that have not been fully observed by RSI surveys. The combined data is then adjusted to match observed count data.

ASSIGNMENT ALGORITHM

2.1.17. The route choice during a model assignment is largely determined by the travel cost incurred on each route. The travel cost for a particular route between two zones is a function of the travel time, the distance travelled, plus any fares/ tolls for the particular route. These travel costs are calculated by the transport models for all possible routes on the networks and the travel demand is then assigned to the least cost routes. The process is repeated a number of times until an optimum or equilibrium is produced. The convergence of the iterative process is monitored and checked to make sure it meets standard targets.

BASE MODEL VALIDATION

2.1.18. The 2016 base model was built, calibrated and validated (adjusted and checked) against an independent set of traffic counts and the journey time data.

2.1.19. Recently, the changes from 2016 to 2018 in network, land use and traffic flows were analysed. Traffic counts from 2018 were compared to 2016 and the results showed that flows had not increased from 2016 levels. Land use and network changes were provided by NCC. Again this showed minimal changes from 2016. As a result the 2016 network was updated to 2018 and the 2016 demand assigned on it. This was considered to accurately represent the traffic conditions of 2018.

3 TRAFFIC FORECASTS

3.1 APPROACH TO FORECASTING

3.1.1. Traffic forecasts were produced for three forecast years, the year of scheme opening, 2023, the design year, 2038, and the horizon year, 2051. Forecast scenarios with and without the proposed GYTRC Scheme were produced and the following changes apply for each of the forecast years:

- A set of transport network changes (indicated in the table in Appendix A);
- Assumptions about changes in values of time and vehicle operating costs over time;
- A set of development assumptions;
- Application of National Trip End Model (NTEM) growth factors as a control on trip growth; and
- Use of the Road Transport Forecasts for growth of freight traffic.

3.1.2. The highway network and development assumptions were arrived at through a process of identifying potential transport improvements and development proposals, and assessing of the likelihood of each of these proposals occurring. In the case of the highway network the changes included not only the GYTRC scheme itself but also known traffic management and highway improvements and highway changes associated with developments.

3.1.3. The resulting forecasts produced reference levels of travel demand, but these did not account for the change in travel costs that would arise from any increased demand. To take account of this a variable demand modelling process was applied in accordance with the DfT WebTAG Guidance. This modified the reference travel demand with changes in trip distribution and travel mode to account for changes in the travel costs.

3.2 FORECAST SCENARIOS

3.2.1. Traffic forecasts have been prepared for three different scenarios, referring to the level, distribution and structure of population, households, employment, and car ownership, which affect car availability, as well as general economic variables such as the level of GDP and fuel prices. Scenarios combine growth information from known committed development and background growth from national forecasts and typically include:

- Core Scenario;
- Low Demand Scenario; and
- High Demand Scenario.

3.3 PRESENTING THE FORECASTS

3.3.1. The transport models produce forecasts for each of the time periods. For the purpose of presenting the results at the Consultation these output traffic flows have been combined and factored to a representative two-way Annual Average Daily Traffic flow (AADT). These are presented on plans and also tabulated. Traffic data is also available for each of the time periods and directions at the same locations for which that AADTs are shown on the plans.

Appendix A

TRANSPORT NETWORK CHANGES

Table 1 - Highway Scheme Coding

Scheme	Base Year 2018	Opening Year 2023	Design Year 2038	Horizon Year 2051
Improvements to Fuller's Hill roundabout	Yes	Yes	Yes	Yes
Improvements to North Quay and The Conge	Yes	Yes	Yes	Yes
Improvements to GY Station Access*	No	Yes	Yes	Yes
Improvements to Vauxhall roundabout	No	Yes	Yes	Yes
Improvements to Gapton Hall roundabout	No	Yes	Yes	Yes
Improvements to Southtown Rd /Station Rd junction	No	Yes	Yes	Yes
Third River Crossing**	No	Yes	Yes	Yes

* This scheme was not included in the base year, because at the time that traffic data was collected the improvements were under construction.

** Just in the with TRC scenario

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